

## ASSIGNMENT 6

Textbook Assignment: "Shapers, Planers, and Engravers," chapter 9, and "Precision Grinding Machines," chapter 10.

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| <p>6-1. The size of a shaper is determined by what factor?</p> <ol style="list-style-type: none"><li>1. The size of the cutter</li><li>2. The depth of the stroke</li><li>3. The size of the motor</li><li>4. The maximum size of a cube it can machine</li></ol> <p>6-2. What mechanism is used to drive the ram of a crank shaper?</p> <ol style="list-style-type: none"><li>1. A hydraulic cylinder</li><li>2. A rack and spur gear</li><li>3. A rocker arm</li><li>4. A pushrod and camshaft</li></ol> <p>6-3. What happens when you set the crankpin of a shaper off center?</p> <ol style="list-style-type: none"><li>1. The rocker arm is prevented from moving when you turn the crank gear</li><li>2. The rocker arm moves when you turn the crank gear</li><li>3. The ram is positioned</li><li>4. The table is positioned horizontally</li></ol> <p>6-4. When using a shaper to make an internal cut, you should use what toolholder?</p> <ol style="list-style-type: none"><li>1. Left-hand</li><li>2. Gang</li><li>3. Swivel-head</li><li>4. Extension</li></ol> <p>6-5. You have to cut a large deep channel into a piece of steel using a shaper. The channel will require machining on the bottom and both sides. You should use what toolholder?</p> <ol style="list-style-type: none"><li>1. Straight</li><li>2. Swivel-head</li><li>3. Spring</li><li>4. Extension</li></ol> | <p>6-6. What should you do to prevent the tool bit from digging into the work on the return stroke of a vertical cut?</p> <ol style="list-style-type: none"><li>1. Fit a hooked tool in the toolhead</li><li>2. Lower the work on the return stroke</li><li>3. Raise the tool bit on the return stroke</li><li>4. Swivel the clapper box to the side</li></ol> <p>6-7. The direction or feed on a shaper is changed by what action?</p> <ol style="list-style-type: none"><li>1. Adjust the feed connecting link</li><li>2. Change the nut on the saddle</li><li>3. Lift and rotate the pawl on the table feed mechanism 1/2 turn</li><li>4. Turn the feed screw</li></ol> <p>6-8. The cutting stroke of a shaper accounts for what percentage of the total machining time?</p> <ol style="list-style-type: none"><li>1. 50%</li><li>2. 60%</li><li>3. 70%</li><li>4. 80%</li></ol> <p>6-9. If the cutting speed in a shaping operation is 40 feet per minute and the length of stroke is 12 inches, what is the approximate number of strokes per minute?</p> <ol style="list-style-type: none"><li>1. 16</li><li>2. 20</li><li>3. 24</li><li>4. 30</li></ol> |
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- 6-10. A shaper is likely to chatter under which of the following circumstances?
1. When the tool bit is not set properly
  2. When the work is loose in the vise
  3. When a formed cutter is in a left-hand holder
  4. All of the above
- 6-11. To line up an internal keyway in a gear with the axis of the gear, what gauge should you use?
1. Micrometer
  2. Feeler gauge
  3. Calipers
  4. Dial indicator
- 6-12. You are cutting an external keyway that extends part way up a shaft. To prevent the tool from binding at the end of the cutting stroke, you should take what action?
1. Use a special tool bit
  2. Drill a hole at the end of the slot
  3. Allow the tool bit to free itself on the return stroke
  4. Raise the tool bit at the end of the cutting stroke
- 6-13. When a rectangular block is being shaped, what edge or surface should be shaped last?
1. A face surface
  2. A side edge
  3. An end edge
  4. A top surface
- 6-14. What should you do first to rough out a piece on a shaper that will have a concave radii?
1. Control by hand the feed on all the rough cuts
  2. Use automatic feed to make a series of horizontal cuts
  3. Use automatic feed to make a series of vertical cuts
  4. Set the horizontal and vertical feed to give the proper contour
- 6-15. To cut angles using a vertical shaper, you should tilt what component?
1. The rail
  2. The ram
  3. The table
  4. The chuck
- 6-16. In rough cutting a rack tooth, when should you lock the graduated collar on the toolslide feed screw of the shaper?
1. After you start the shaper
  2. After you bring the tool into contact with the work
  3. Before you clamp the work to the vice or table
  4. Before you set the graduated dial on the crossfeed screw to zero
- 6-17. The size of a planer is determined by what characteristic?
1. The length of stroke
  2. The size of the work it will accommodate
  3. The size of the motor
  4. The length of the bed
- 6-18. The crossrail on a planer is designed to hold what component?
1. The table
  2. The vise
  3. The toolhead
  4. The column
- 6-19. The columns on a planer are designed to support which of the following items?
1. The work
  2. The table
  3. The gear train
  4. The crossrail

- 6-20. You should lock the vertical slide in place at what point in a planer machining operation?
1. After you make the tool setting
  2. Before touching off on the work
  3. Before setting the cross-slide saddle
  4. After starting the cut
- 6-21. Cutter speed on a pantograph is affected by which of the following factors?
1. The depth of cut
  2. The rate of feed
  3. The type of material being cut
  4. All of the above
- 6-22. You are using a very small cutter to engrave small letters and getting poor results. What is the most likely cause?
1. The copyholder is too high
  2. The cutterhead assembly is set wrong
  3. The cutter is improperly ground
  4. The stylus point is worn
- 6-23. If the length of the copy is 1.8 inches and the length of the finished job is 1.2 inches, what is the reduction?
1. 0.6
  2. 1.5
  3. 2.2
  4. 3.0
- 6-24. A pantograph copyholder has what type of slot?
1. Square
  2. Oval
  3. Dovetailed
  4. Straight

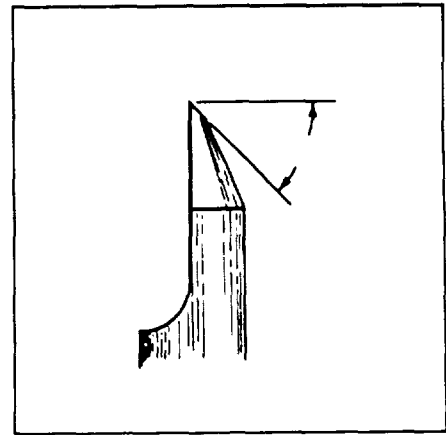


Figure 6A

IN ANSWERING QUESTIONS 6-25 AND 6-26.  
REFER TO FIGURE 6A.

- 6-25. What name is usually given to the indicated angle?
1. Clearance
  2. Rake
  3. Cutting
  4. Relief
- 6-26. What determines the size of the indicated angle?
1. The spindle speed
  2. The size of the cutter
  3. The material to be cut
  4. The size of the copy
- 6-27. A worn cutter is indicated by which of the following characteristics?
1. It turns red
  2. It runs slower
  3. It vibrates
  4. It does not cut cleanly
- 6-28. If a pantograph cutter has inadequate chip clearance, what part of the cutter will rub against the work?
1. The point
  2. The back side
  3. The front side
  4. The rake angle

- 6-29. What type of dresser is used to true a pantograph high-speed cutter grinding wheel?
1. Carbide
  2. Diamond
  3. Oxide
  4. Carbon
- 6-30. A concave forming guide may be used for engraving on which of the following shapes of workpieces?
1. Flat
  2. Concave
  3. Convex
  4. All of the above
- 6-31. Three- or four-sided cutters are used for engraving on which of the following materials?
1. Large, heavy work
  2. Very soft work
  3. Small steel pieces
  4. Wood
- 6-32. When engraving a dial face that has 10 graduations, you should rotate the rotary table how many degrees between cuts?
1. 36°
  2. 45°
  3. 60°
  4. 72°
- 6-33. Which of the following changes will make a grinding wheel act "softer"?
1. Reduce the wheel diameter
  2. Increase the wheel speed
  3. Reduce the grain depth of cut
  4. Increase the arc of contact of the wheel
- 6-34. What wheel speed range is most common in precision grinding?
1. 1,000 to 2,000 fpm
  2. 3,000 to 4,000 fpm
  3. 5,500 to 9,500 fpm
  4. 9,500 to 10,500 fpm
- 6-35. A grinding wheel has a circumference of 18 inches and is set on a spindle whose speed is 4,000 rpm. What is its surface speed?
1. 4,500 fpm
  2. 6,000 fpm
  3. 7,500 fpm
  4. 10,000 fpm
- 6-36. You are beginning to rough grind a job on a surface grinder? Your initial rough cuts should be what depth?
1. 0.002 in.
  2. 0.003 in.
  3. 0.005 in.
  4. 0.006 in.
- 6-37. Which of the following characteristics is NOT desirable in a cutting fluid?
1. High cooling capacity
  2. High viscosity
  3. Low flammability
  4. Noncorrosiveness
- 6-38. You are taking rough cuts during surface grinding. The cross traverse table moves in what direction relative to the wheel spindle for each stroke of the sliding table?
1. Parallel to the spindle with a feed slightly less than the thickness of the grinding wheel
  2. Perpendicular to the spindle with a feed equal to the diameter of the grinding wheel
  3. Parallel to the spindle with a feed equal to the thickness of the workpiece
  4. Perpendicular to the spindle with a feed equal to the thickness of the grinding wheel
- 6-39. Work will not remain in place on a magnetic chuck unless it contacts at least what number of poles?
1. 1
  2. 2
  3. 3
  4. 4

- 6-40. What method is used to remove deep scratches from a magnetic chuck?
1. Planing
  2. Milling
  3. Sanding
  4. Surface grinding
- 6-41. When operating a surface grinder, the grinding wheel is fed into the work by using what components?
1. The sliding table
  2. The cross traverse table
  3. The wheelhead
  4. The traverse table
- 6-42. The top of the sliding table on a surface grinder has what shape of slots milled into it?
1. Dovetail
  2. T
  3. Concave
  4. Square
- 6-43. You have rough ground a piece of hardened steel and you are ready to finish grind it. You should make what adjustment to the longitudinal traverse speed of the worktable?
1. Increase it from 10 fpm to 25 fpm
  2. Increase it from 25 fpm to 40 fpm
  3. Decrease it from 40 fpm to 35 fpm
  4. Decrease it from 60 fpm to 40 fpm
- 6-44. The wheelhead on a cylindrical grinder has vertical movement.
1. True
  2. False
- 6-45. What component of a surface grinder is NOT found on a cylindrical grinder?
1. A coolant system
  2. A hydraulic power Unit
  3. A cross traverse table
  4. A wheelhead
- 6-46. You are setting up work on a cylindrical grinder. When should you start the coolant flow?
1. When you begin grinding the work
  2. Just before you dress the wheel
  3. After you have made a cleanup cut
  4. As soon as you start the spindle motor and hydraulic pump
- 6-47. On a cylindrical grinder, the distance of longitudinal traverse per revolution of the workpiece is determined by what factor?
1. The width of the grinding wheel
  2. The length of the workpiece
  3. The width of the workpiece
  4. The diameter of the grinding wheel
- 6-48. When is a cutter considered dull and in need of sharpening?
1. When the wear land is worn and rounded
  2. When the wear land is between 0.010 and 0.035 inch wide
  3. When the wear land becomes less than 0.010 inch wide
  4. When the secondary clearance begins to rub
- 6-49. Grinding wheels can be mounted on both ends of the spindle on the wheelhead of a tool and cutter grinder.
1. True
  2. False

- 6-50. What feature of a tool and cutter grinder allows you to operate it while standing in the best position to see the work?
1. A left-hand footstock and a right-hand tailstock
  2. One control handwheel at the front of the grinder and another at the back
  3. A column-mounted wheelhead and a double-ended spindle
  4. A taper table and a sliding table
- 6-51. You are grinding a cutter on a tool and cutter grinder and the wheel begins to burr the edge of the cutter. How should you solve the problem?
1. Rotate the grinding wheel toward the cutting edge
  2. Reduce the grinding speed
  3. Increase the grinding speed
  4. Decrease the speed
- 6-52. Which of the following cutters should be ground using a rounded tooth rest blade?
1. Straight-fluted
  2. Helical-tooth
  3. Side-milling
  4. Plain straight-tooth
- 6-53. What type of tool rest blade holder has a micrometer adjustment?
1. Plain
  2. Bevel
  3. Angular
  4. Universal
- 6-54. The secondary clearance angle of a milling cutter is usually larger than the primary clearance angle by what amount?
1. 1 to 3°
  2. 2 to 4°
  3. 3 to 5°
  4. 4 to 6°
- 6-55. When the primary land of a milling cutter becomes too wide, what problem will usually arise?
1. The cutter will run slower
  2. The heel of the cutter tooth will drag
  3. The secondary land will become too wide
  4. The cutter will break
- 6-56. When grinding a milling cutter using a straight wheel, you should change the clearance angle by what method?
1. Tilt the table
  2. Raise or lower the head
  3. Rotate the cutter
  4. Tilt the head
- 6-57. You are sharpening a plain milling cutter with helical teeth and using a cup-type wheel. You should swivel the wheelhead 89° for what purpose?
1. To provide maximum compensation for wheel wear
  2. To position the wheel head axis in the same horizontal plane as the axis of the footstock centers
  3. To be sure the end of the cutter clears the opposite cutting face
  4. To be sure the end of the cutter does not clear the opposite cutting face
- 6-58. To grind a cutter requiring a 5-degree clearance angle using a 6-inch diameter wheel, you should raise the wheelhead what amount?
1. 0.002 in.
  2. 0.026 in.
  3. 0.250 in.
  4. 0.261 in.

6-59. You are using a tool and cutter grinder to sharpen the peripheral teeth on an end mill. It will be necessary to change or remove the cutter's size markings.

1. True
2. False

6-60. You are using a tool and cutter grinder to grind an involute formed cutter mounted on a mandrel. You should grind what area of the teeth first?

1. The front
2. The back
3. The face
4. The side